

Math 16A (Spring 2008)
Schlichter
Midterm 2 Review

*Note: Be sure to understand ALL problems from the homework. These are just some selected practice problems.

Derivatives: Find the derivative of the following functions:

1. $f(x) = x^8 - 3x^{-6} + 500^{10} - x^{-\frac{2}{3}} + \frac{1}{\sqrt{x}} + 8$

2. $f(x) = \frac{(2x - 5)^2}{x}$

3. $f(x) = (x^2 + \frac{1}{x})^5$

4. $f(x) = (3x^3 + 7)^2(x^2 - 2x)$

5. $f(x) = \frac{x^2 + x - 1}{\sin x - 1}$

6. $f(x) = \frac{2x^2 - 3}{\sqrt{\cos x}}$

7. $f(x) = (x^2 - 1)(8x + \frac{1}{x})(x^3 + 2x)$

8. $f(x) = \csc 3x + \cot 3x$

9. Given $f'(x) = 5x^4 - 6x^2 + \cos 2x$, find $f'''(x)$

Average/Instantaneous Rate of Change

10. Find the average rate of change of the function over the given interval. Then compare with the instantaneous rate of change at the endpoints.

$$f(x) = x^3 + x, [-2, 2]$$

11. Also think about word problems like 41-46 on page 167 from the Chapter 2 Review Exercises

Graphing functions

12. Find when $f'(x) = 0$ and use a sign chart to find the relative extrema of the function $f(x) = \frac{1}{4}x^4 - 8x$.
13. Determine the intervals on which the graph of the following function is concave up or concave down, $h(x) = x^5 - 10x^2$.
14. Consider the function $f(x) = x^3 - \frac{3}{2}x^2$
 - a) Find any/all relative extrema (use a sign chart)
 - b) Find any/all points of inflection (use a sign chart)
 - c) Find any/all x and y intercepts
 - d) Find any/all horizontal and vertical asymptotes (use limits)
 - e) Sketch the graph of this function
15. Consider the function $f(x) = \frac{2x}{1+x^2}$
 - a) Find any/all relative extrema (use a sign chart)
 - b) Find any/all points of inflection (use a sign chart)
 - c) Find any/all x and y intercepts
 - d) Find any/all horizontal and vertical asymptotes (use limits)
 - e) Sketch the graph of this function

Also review marginal profit, revenue, and cost, as well as velocity and acceleration.
Some suggested review problems to look at

Chapter 2 Review Exercises
pg. 169, 47-56, 89, 90, 100